Cisco Catalyst 3550 Series Intelligent Ethernet Switches

Product Overview

The Cisco Catalyst® 3550 Series Intelligent Ethernet Switches is a new line of enterprise-class, stackable, multilayer switches that provide high availability, scalability, security and control to enhance the operation of the network. With a range of Fast Ethernet and Gigabit Ethernet configurations, the Catalyst 3550 Series can serve as both a powerful access layer switch for medium enterprise wiring closets and as a backbone switch for mid-sized networks. For the first time, customers can deploy network-wide intelligent services, such as advanced quality of service (QoS), rate-limiting, Cisco security access control lists, multicast management, and high-performance IP routing—while maintaining the simplicity of traditional LAN switching. Embedded in the Catalyst 3550 Series is the Cisco Cluster Management Suite (CMS) Software, which allows users to simultaneously configure and troubleshoot multiple Catalyst desktop switches using a standard Web browser. Cisco CMS Software provides new configuration wizards that greatly simplify the implementation of converged applications and network-wide services.

The Cisco Catalyst 3550 Series Intelligent Ethernet Switches include the following configurations:

- Catalyst 3550-24 Switch—24 10/100 ports and two Gigabit Interface Converter (GBIC)-based Gigabit Ethernet ports; 1 rack unit (RU)
- Catalyst 3550-48 Switch—48 10/100 ports and two GBIC-based Gigabit Ethernet ports; 1 RU
- Catalyst 3550-12G Switch—10 GBIC-based Gigabit Ethernet ports and two 10/100/1000BaseT ports; 1.5 RU
- Catalyst 3550-12T switch—10 10/100/1000BaseT ports and two GBIC-based Gigabit Ethernet ports; 1.5 RU

The built-in Gigabit Ethernet ports accommodate a range of GBIC transceivers, including the Cisco GigaStack™ GBIC, 1000BaseT, 1000BaseSX, 1000BaseLX/LH, and 1000BaseZX GBICs. The dual GBIC-based Gigabit Ethernet implementation on the Fast Ethernet configurations provides customers tremendous deployment flexibility—allowing customers to implement one type of stacking and uplink configuration today, while preserving the option to migrate that configuration in the future. High levels of stack resiliency can also be implemented by deploying dual redundant Gigabit Ethernet uplinks, a redundant GigaStack GBIC loopback cable, UplinkFast and CrossStack UplinkFast technologies for high-speed uplink and stack interconnection failover, and Per VLAN Spanning Tree Plus (PVST+) for uplink load balancing. This Gigabit Ethernet flexibility makes the Catalyst 3550 switches an ideal LAN edge complement to the Cisco Catalyst 6500 family of Gigabit Ethernet optimized core LAN switches.

Included with the Catalyst 3550-24 and 3550-48 are the Standard Multilayer Software Image (SMI) or the Enhanced Multilayer Software Image (EMI). The EMI provides a richer set of enterprise-class features including hardware-based IP unicast and

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multicast routing, inter-virtual LAN (VLAN) routing, routed access control lists (RACLs), and the Hot Standby Router Protocol (HSRP). After initial deployment, the Enhanced Multilayer Software Image Upgrade Kit gives users the flexibility to upgrade to the EMI. The Catalyst 3550-12T and 3550-12G are only available with the Enhanced Multilayer Software Image.

Figure 1 Catalyst 3550-24 Intelligent Ethernet Switch

Figure 2 Catalyst 3550-48 Intelligent Ethernet Switch

Figure 3 Catalyst 3550-12G and 3550-12T Intelligent Ethernet Switches

Intelligence in the Network

Networks of today are evolving to address four new developments at the network edge:

- Increase in desktop computing power
- Introduction of bandwidth-intensive applications
- Expansion of highly sensitive data on the network
- Presence of multiple device types, such as IP phones and wireless LAN access points

These new demands are contending for resources with many existing mission-critical applications. As a result, IT professionals must view the edge of the network as critical to effectively manage the delivery of information and applications.

As companies increasingly rely on networks as the strategic business infrastructure, it is more important than ever to ensure their high availability, security, scalability and control. By adding Cisco intelligent functionality to the wiring closet, customers can now deploy network-wide intelligent services that address these requirements in a consistent way from the desktop to the core and through the WAN.

With Cisco Catalyst Intelligent Ethernet switches, Cisco enables companies to realize the full benefits of adding intelligent services into their networks. Deploying capabilities that make the network infrastructure highly available to accommodate time-critical needs, scalable to accommodate growth, secure enough to protect confidential information, and capable of differentiating and controlling traffic flows are key to further optimizing network operations.

Network Control through Advanced Quality of Service and Rate Limiting

The Cisco Catalyst 3550 offers superior Layer 3 granular QoS features to ensure that network traffic is classified, prioritized, and congestion is avoided in the best possible manner. The Catalyst 3550 can classify, reclassify, police, and mark the incoming packets before the packet is placed in the shared buffer. Packet classification allows the network elements to discriminate between various traffic flows and enforce policies based on Layer 2 and Layer 3 QoS fields.

To implement QoS, first, the Catalyst 3550 switches identify traffic flows, or packet groups, and classifies or reclassifies these groups using the Differentiated Services Code Point field (DSCP) and/or the 802.1p class of service (CoS) field. Classification and reclassification can be based on criteria as specific as the source/destination IP address, source/destination Media Access Control (MAC) address or the Layer 4 Transmission Control Protocol (TCP)/User Datagram Protocol (UDP) port. At the ingress, the Catalyst 3550 will also perform policing and marking

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of the packet. Control plane and data plane access control lists (ACLs) are supported on all ports to ensure proper policing and marking on a per packet basis.

After the packet goes through classification, policing, and marking, it is then assigned to the appropriate queue before exiting the switch. The Catalyst 3550 supports four egress queues per port, which allows the network administrator to be more discriminating and specific in assigning priorities for the various applications on the LAN. At egress, the switch performs scheduling and congestion control. Scheduling is an algorithm/process that determines the order in which the queues are processed. The switches support Weighted Round Robin (WRR) scheduling and strict priority queuing. The WRR queuing algorithm ensures that the lower priority packets are not entirely starved for bandwidth and are serviced without compromising the priority settings administered by the network manager. Strict priority queuing ensures that the highest priority packets will always get serviced first, ahead of all other traffic, and allows the other three queues to be serviced using WRR scheduling. In conjunction with scheduling, the Catalyst 3550 Gigabit Ethernet ports support congestion control via Weighted Random Early Detection (WRED). WRED avoids congestion by setting thresholds at which packets are dropped before congestion occurs.

These features allow network administrators to prioritize mission-critical and/or bandwidth-intensive traffic, such as ERP (Oracle, SAP, and so on.), voice (IP telephony traffic) and CAD/CAM over less time-sensitive applications such as FTP or e-mail (SMTP). For example, it would be highly undesirable to have a large file download destined to one port on a wiring closet switch and have quality implications such as increased latency in voice traffic, destined to another port on this switch. This condition is avoided by ensuring that voice traffic is properly classified and prioritized throughout the network. Other applications, such as web browsing, can be treated as low priority and handled on a best-efforts basis.

The Cisco Catalyst 3550 is capable of performing rate limiting via its support of the Cisco Committed Information Rate (CIR) functionality. Through CIR, bandwidth can be guaranteed in increments as low as 8 Kbps. Bandwidth can be allocated based on several criteria including MAC source address, MAC destination address, IP source address, IP destination address, and TCP/UDP port number. Bandwidth allocation is essential in network environments requiring service-level agreements or when it is necessary for the network manager to control the bandwidth given to certain users. Each Catalyst 3550 10/100 port supports 8 aggregate or individual ingress policers and 8 aggregate egress policers. Each Catalyst 3550 Gigabit Ethernet port supports 128 aggregate or individual policers and 8 aggregate egress policers. This gives the network administrator very granular control of the LAN bandwidth.

Network Scalability through High-Performance IP Routing

With hardware-based IP routing and the Enhanced Multilayer Software Image, the Catalyst 3550 switches deliver high performance dynamic IP routing. The Cisco Express Forwarding (CEF)-based routing architecture allows for increased scalability and performance. This architecture allows for very high-speed lookups while also ensuring the stability and scalability necessary to meet the needs of future requirements. In addition to dynamic IP unicast routing, the Catalyst 3550 Series is perfectly equipped for networks requiring multicast support. Multicast routing protocol (PIM) and Internet Group Management Protocol (IGMP) snooping in hardware make the Catalyst 3550 Series switches ideal for intensive multicast environments.

These switches offer several advantages to improve network performance when used as a stackable wiring closet switch or as a top-of-the-stack wiring closet aggregator switch. For example, implementing routed uplinks from the top of the stack will improve network availability by enabling faster failover protection and simplifying the Spanning-Tree Protocol algorithm by terminating all Spanning-Tree Protocol instances at the aggregator switch. If one of the uplinks fails, quicker failover to the redundant uplink can be achieved via a scalable routing protocol such as Open Shortest Path First (OSPF) or Enhanced Interior Gateway Routing Protocol (EIGRP) rather than relying on standard Spanning-Tree Protocol convergence. Redirection of a packet after a link failure via a routing protocol results in faster network convergence than a solution that uses Layer 2 Spanning

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Tree enhancements. Additionally, routed uplinks allow better bandwidth utilization by implementing equal cost routing (ECR) on the uplinks to perform load balancing. This results in dynamic load balancing in a part of the network that often acts as the bottleneck. And, routed uplinks optimize the utility of uplinks out of the wiring closet by eliminating unnecessary broadcast data flows into the network backbone.

The Catalyst 3550 also offers dramatic bandwidth savings as a stackable wiring closet switch in a multicast environment. Using routed uplinks to the network core will eliminate the requirement to transmit multiple streams of the same multicast from the upstream content servers to the wiring closet. For example, if three users are assigned to three separate virtual LANs (VLANs) and they all want to view multicast ABC, then three streams of multicast ABC are required to be transmitted from the upstream router to the wiring closet switch—assuming the wiring closet switch is not capable of routed uplinks. Deploying IP routing to the core with Catalyst 3550 switches allows users to create a scalable, multicast-rich network.

Network Security through Cisco Access Control Lists

The Cisco Catalyst 3550 switches offer enhanced data security through the use of access control lists (ACLs). By denying packets based on source and destination MAC addresses, IP addresses, or TCP/UDP ports, users can be restricted from sensitive portions of the network. Also, due to the fact that all ACL lookups are done in hardware, forwarding and routing performance is not compromised when implementing ACL-based security in the network.

Network managers can also implement higher levels of data security and boost LAN performance by deploying up to 1,005 virtual LANs (VLANs) per switch. This ensures that data packets are forwarded only to stations within a specific VLAN, creating separate collision domains between groups of ports on the network and reducing broadcast transmission. VLAN trunks can be created from any port using the standards-based 802.1Q or Cisco Inter-Switch Link (ISL) VLAN trunking architecture. In addition, private VLAN edge provides security and isolation between ports on a switch, ensuring that traffic travels directly from its entry point to the aggregation device through a virtual path and cannot be directed to a different port. Local Proxy Address Resolution Protocol (ARP) works in conjunction with private VLAN edge to minimize broadcasts and maximize available bandwidth. For superior security management, the Catalyst 3550 Series supports standard and extended ACLs on VLAN ports as well as routed ports.

With the multilayer Cisco Catalyst 3550 switches, network managers can implement high levels of console security. Multilevel access security on the switch console and the web-based management interface prevents unauthorized users from accessing or altering switch configuration. Terminal Access Controller Access Control System (TACACS+) authentication enables centralized access control of the switch and restricts unauthorized users from altering the configuration.

Network Management with the Cisco Cluster Management Suite Software

The Cisco Cluster Management Suite (CMS) is Web-based software that is embedded in Catalyst 3550, 2950, 3500 XL, 2900 XL, 2900 LRE XL, and 1900 switches. Through Cisco Switch Clustering technology, users access Cisco CMS with any standard Web browser to manage up to 16 of these switches at once, regardless of their geographic proximity—with the option of using a single IP address for the entire cluster if desired. With the addition of the Catalyst 3550 switches, Cisco CMS Software can now extend beyond routed boundaries for even more flexibility in managing a Cisco cluster.

Cisco CMS provides an integrated management interface for delivering intelligent services, enabling users to manage their entire LAN with one robust tool without having to learn the command-line interface (CLI). By bringing the simplicity of traditional LAN switching to intelligent services such as multilayer switching, QoS, multicast, and security access control lists (ACLs), Cisco CMS allows administrators to take advantage of benefits formerly reserved for only the most complex networks.

The new Guide Mode in Cisco CMS leads the user step-by-step through the configuration of high-end features and provides enhanced online help for context-sensitive assistance. In addition, a Configuration Wizard provides automated configuration of the switch for video streaming or videoconferencing. Future software will provide Configuration Wizards for voice

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over IP (VoIP), mission-critical applications, and security. These Wizards can save hours of time for network administrators, eliminate human errors, and ensure the configuration of the switch is optimized for these applications.

Cisco CMS supports standards-based connectivity options such as Ethernet, Fast Ethernet, Fast EtherChannel®, Gigabit Ethernet, and Gigabit EtherChannel connectivity. Because Cisco Switch Clustering technology is not limited by proprietary stacking modules, stacking cables or interconnection media, Cisco CMS expands the traditional cluster domain beyond a single wiring closet and lets users mix and match interconnections to meet specific management, performance, and cost requirements.

Cisco Catalyst 3550 switches can be configured either as command or member switches in a Cisco switch cluster. Cisco CMS also allows the network administrator to designate a standby or redundant command switch, which takes the commander duties should the primary command switch fail. Other key features include the ability to configure multiple ports and switches simultaneously, as well as perform software updates across the entire cluster at once. Bandwidth graphs and link reports provide useful diagnostic information and the topology map gives network administrators a quick view of the network status.

In addition to Cisco CMS, the Catalyst 3550 products are manageable via CiscoWorks 2000 products, which provide full enterprise-class network management.

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Product Features and Benefits

Feature	Benefit
Availability	
Superior Redundancy for Fault Backup	• Cisco UplinkFast/BackboneFast technologies ensure quick fail-over recovery enhancing overall network stability and reliability. • CrossStack UplinkFast (CSUF) technology provides increased redundancy and network resiliency through fast spanning-tree convergence (less than two seconds) across a stack of switches using GigaStack™ GBICs in an independent stack backplane cascaded configuration. • Supports Cisco Hot Standby Router Protocol (HSRP) to create redundant failsafe routing topologies—requires Enhanced Multilayer Software Image (EMI). • Redundant stacking connections provide support for a redundant loopback connection for top and bottom switches in an independent stack backplane cascaded configuration. • Command switch redundancy enabled in the Cisco Cluster Management Suite (CMS) Software allows customers to designate a backup command switch that takes over cluster management functions if the primary command switch fails. • Provides unidirectional link detection (UDLD) for detecting and disabling unidirectional links on fiber-optic interfaces caused by incorrect fiber-optic wiring or port faults. • Support for Cisco's optional Redundant Power System 300 (RPS 300) that provides superior internal power source redundancy for up to six Cisco networking devices resulting in improved fault tolerance and network uptime.
Integrated Cisco IOS® Features for Bandwidth Optimization	• Bandwidth aggregation of up to 16 Gbps through Gigabit EtherChannel® technology and up to 1.6 Gbps through Fast EtherChannel technology enhances fault tolerance and offers higher speed aggregated bandwidth between switches, to routers and individual servers. • Per-port broadcast, multicast, and unicast storm control prevents faulty end stations from degrading overall systems performance. • IEEE 802.1D Spanning-Tree Protocol support for redundant backbone connections and loop-free networks simplifies network configuration and improves fault tolerance. • Per VLAN Spanning Tree Plus (PVST+) allows for Layer 2 load sharing on redundant links to efficiently utilize the extra capacity inherent in a redundant design. • Equal cost routing for Layer 3 load balancing and redundancy—requires Enhanced Multilayer Software Image (EMI). • Local Proxy ARP works in conjunction with private VLAN edge to minimize broadcasts and maximize available bandwidth. • VLAN Trunking Protocol (VTP) pruning limits bandwidth consumption on VTP trunks by flooding broadcast traffic only on trunk links required to reach the destination devices. • Internet Group Management Protocol (IGMP) snooping provides for fast client joins and leaves of multicast streams and limits bandwidth-intensive video traffic to only the requestors. • Multicast VLAN registration (MVR) continuously sends multicast streams in a multicast VLAN while isolating the streams from subscriber VLANs for bandwidth and security reasons.

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Product Features and Benefits (Continued)

Feature	Benefit
Security	
Network-Wide Security Features	• IEEE 802.1x (planned future software support) for dynamic port-based security. • Cisco security VLAN ACLs (VACLs) on all VLANs to prevent unauthorized data flows to be bridged within VLANs. • Cisco standard and extended IP security Router ACLs (RACLs) for defining security policies on routed interfaces for control plane and data plane traffic—requires Enhanced Multilayer Software Image (EMI). • Time-based ACLs allow the implementation of security settings during specific periods of the day. • Private VLAN edge provides security and isolation between ports on a switch, ensuring that voice traffic travels directly from its entry point to the aggregation device through a virtual path and cannot be directed to a different port. • TACACS+ and RADIUS (planned future software support) authentication to enable centralized control of the switch and restrict unauthorized users from altering the configuration. • MAC-based port-level security prevents unauthorized stations from accessing the switch (planned future software support). • Multilevel security on console access prevents unauthorized users from altering the switch configuration. • The user-selectable address-learning mode simplifies configuration and enhances security. • Bridge protocol data unit (BPDU) guard shuts down Spanning-Tree Protocol PortFast-enabled interfaces when BPDUs are received to avoid accidental topology loops. • Spanning-tree root guard (STRG) prevents edge devices not in the network administrator's control from becoming Spanning-Tree Protocol root nodes.
Control	
Advanced Quality of Service	• 802.1p class of service (CoS) and DiffServ Code Point field (DSCP) classification via marking and reclassification on a per packet basis using source/destination IP address, source/destination MAC address, or Layer 4 TCP/UDP port number. • Cisco control plane and data plane quality of service ACLs on all ports to ensure proper marking on a per packet basis. • Four egress queues per port supported in hardware to enable differentiated management of up to four types of traffic. • Weighted Round Robin (WRR) scheduling to ensure differential prioritization of packet flows by intelligently servicing the egress queues. • Weighted Random Early Detection (WRED) on all Gigabit Ethernet ports for avoidance of congestion at the egress queues before a disruption occurs. • Strict priority queuing to guarantee that the highest priority packets will always get serviced ahead of all other traffic. • No performance penalty for highly granular quality of service functionality.
Granular Rate-Limiting	• Cisco Committed Information Rate (CIR) functionality allows bandwidth to be guaranteed in increments as low as 8 Kbps. • Rate-limiting based on source/destination IP address, source/destination MAC address, or Layer 4 TCP/UDP information—or any combination of these fields—using QoS ACLs (IP ACLs or MAC ACLs), class maps, and policy maps. • Ability to easily manage data flows asynchronously upstream and downstream from the end station or on the uplink via ingress and ingress policing. • 8 aggregate or individual ingress policers and 8 aggregate egress policers on each 10/100 port. • 128 aggregate or individual ingress policers and 8 aggregate egress policers on each Gigabit Ethernet port.

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Product Features and Benefits (Continued)

Feature	Benefit
Superior Manageability	• Built-in Web-based Cisco Cluster Management Suite (CMS) Software provides an easy-to-use Web-based management interface through a standard Web browser. • Simple Network Management Protocol (SNMP) Version 1 and Version 2c, and Telnet interface support delivers comprehensive in-band management, and a command-line interface (CLI)-based management console provides detailed out-of-band management. • Manageable through CiscoWorks™ network management software on a per-port and per-switch basis providing a common management interface for Cisco routers, switches and hubs. • Cisco IOS® Software CLI support provides common user interface and command set with all Cisco routers and Cisco desktop switches. • Supported by the Cisco Quality Policy Manager (QPM) solution for end-to-end QoS policies (planned future software support). • Supported by the CiscoWorks 2000 LAN Management Solution. • Supported by the Service Assurance (SA) Agent to facilitate service level management throughout the LAN. • Switch Database Manager templates for access, routing, and VLAN deployment scenarios allow the network administrator to easily maximize memory allocation to the desired features based on deployment-specific requirements. • VLAN trunks can be created from any port using either standards-based 802.1Q tagging or the Cisco ISL VLAN architecture. • Support for up to 1,005 VLANs per switch and up to 128 instances of spanning tree per switch. • Cisco Group Management Protocol (CGMP) server functionality enables a switch to serve as the CGMP router for CGMP client switches—requires Enhanced Multilayer Software Image (EMI). • IGMP snooping provides for fast client joins and leaves of multicast streams and limits bandwidth-intensive video traffic to only the requestors. • Embedded Remote Monitoring (RMON) software agent supports four RMON groups (History, Statistics, Alarms and Events) for enhanced traffic management, monitoring, and analysis. • Support for all nine RMON groups through use of a Switch Port Analyzer (SPAN) port, which permits traffic monitoring of a single port, a group of ports, or the entire switch from a single network analyzer or RMON probe. • Domain Name Services (DNS) provide IP address resolution with user-defined device names. • Trivial File Transfer Protocol (TFTP) reduces the cost of administering software upgrades by downloading from a centralized location. • Network Timing Protocol (NTP) provides an accurate and consistent timestamp to all switches within the intranet. • Multifunction LEDs per port for port status, half-duplex/full-duplex, 10BaseT/100BaseTX /1000BaseT indication, as well as switch-level status LEDs for system, redundant power supply, and bandwidth utilization provide a comprehensive and convenient visual management system.
Scalability	
High-Performance IP Routing All IP routing features require the Enhanced Multilayer Software Image (EMI)	• Cisco Express Forwarding (CEF)-based routing architecture performed in hardware to deliver extremely high-performance IP routing. • Support for all commonly deployed and industry standard IP unicast routing protocols (RIPv1, RIPv2, OSPF, IGRP, EIGRP) for load balancing and constructing scalable LANs. • Static IP routing for manually building a routing table of network path information. • Inter-VLAN IP routing for full Layer 3 routing between two or more VLANs. • Equal cost routing for load balancing and redundancy. • Protocol-Independent Multicast (PIM) for IP multicast routing within a network that enables the network to receive the multicast feed requested and for switches not participating in the multicast to be pruned—support for PIM sparse mode (PIM-SM), PIM dense mode (PIM-DM), and PIM sparse-dense mode. • Distance Vector Multicast Routing Protocol (DVMRP) tunneling for interconnecting two multicast-enabled networks across non-multicast networks. • Fallback bridging for forwarding of non-IP traffic between two or more VLANs. • Cisco Hot Standby Router Protocol (HSRP) to create redundant fail-safe routing topologies.

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Product Features and Benefits (Continued)

Feature	Benefit
Ultra-Flexible and Scalable Stacking and Cisco Switch Clustering Technology	• The Cisco GigaStack® Gigabit Interface Converter (GBIC) delivers a hardware-based, independent stacking bus with up to 2 Gbps forwarding rate in a point-to-point configuration, or 1-Gbps forwarding bandwidth when daisy chained with up to nine switches. • Cisco Cluster Management Suite (CMS) Software allows the user to manage up to 16 inter-connected Cisco Catalyst 3550, 2950, 3500 XL, 2900 XL, 2900 LRE XL, and 1900 switches through a single IP address, without the limitation of being physically located in the same wiring closet. • Full backward compatibility of the Cisco CMS Software ensures that any Cisco Catalyst 3550, 2950, 3500 XL, 2900 XL, 2900 LRE XL, or 1900 Switch can be managed with a Cisco Catalyst 3550 Switch. • The cluster software upgrade feature allows the user to automatically upgrade the system software on a group of Cisco Catalyst 3550, 2950, 3500 XL, 2900 XL, 2900 LRE XL, and 1900 switches. • Cisco Cluster Management Suite Software has been extended to include multilayer feature configurations such as Routing Protocols, ACLs, and QoS parameters. • Clustering now supports member discovery and cluster creation across a single Catalyst 3550 routed hop, enabling the entire LAN to be managed in a single Web interface (and with a single IP address if desired). • Cisco Cluster Management Suite Configuration Wizards use just a few user inputs to automatically configure the switch to optimally handle different types of traffic: voice, video, or high-priority data. In addition, a wizard for security is provided to restrict unauthorized access to servers with sensitive data. (Voice, data, and security wizards will be available in a future software release.) • Cisco Cluster Management Suite Guide Mode assists users in the configuration of powerful advanced features by providing step-by-step instructions. • Cisco Cluster Management Suite provides enhanced online help for context-sensitive assistance. • Easy-to-use graphical interface provides both a topology map and front panel view of the cluster.
Ease of Use and Ease of Deployment	• Auto-configuration eases deployment of switches in the network by automatically configuring multiple switches across a network via a boot server. • Auto-sensing on each non-GBIC port detects the speed of the attached device and automatically configures the port for 10-, 100-, or 1000-Mbps operation, easing the deployment of the switch in mixed 10, 100, and 1000BaseT environments. • Auto-negotiating on all ports automatically selects half- or full-duplex transmission mode to optimize bandwidth. • Cisco Discovery Protocol (CDP) Versions 1 and 2 enable a CiscoWorks network management station to automatically discover the switch in a network topology. • Cisco VLAN Trunking Protocol (VTP) supports dynamic VLANs and dynamic trunk configuration across all switches. • Support for dynamic VLAN assignment through implementation of VLAN Membership Policy Server (VMPS) client functionality provides flexibility in assigning ports to VLANs. • Dynamic Trunking Protocol (DTP) enables dynamic trunk configuration across all ports in the switch. • Port Aggregation Protocol (PAgP) automates the creation of Cisco Fast EtherChannel® or Gigabit EtherChannel groups, enabling linking to another switch, router, or server. • Dynamic Host Configuration Protocol (DHCP) relay allows a broadcast DHCP request to be forwarded to the network DHCP server—requires Enhanced Multilayer Software Image (EMI). • IEEE 802.3z-compliant 1000BaseSX, 1000BaseLX/LH, 1000BaseZX, and 1000BaseT physical interface support through a field-replaceable GBIC module provides customers unprecedented flexibility in switch deployment. • The default configuration stored in Flash ensures that the switch can be quickly connected to the network and can pass traffic with minimal user intervention.

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Product Specifications

Feature	Description
Performance	• 24 Gbps switching fabric (Catalyst 3550-12G and Catalyst 3550-12T), 13.6 Gbps switching fabric (Catalyst 3550-48), 8.8 Gbps switching fabric (Catalyst 3550-24) • 12 Gbps maximum forwarding bandwidth at Layer 2 and Layer 3 (Catalyst 3550-12G and Catalyst 3550-12T), 6.8 Gbps maximum forwarding bandwidth at Layer 2 and Layer 3 (Catalyst 3550-48), 4.4 Gbps maximum forwarding bandwidth at Layer 2 and Layer 3 (Catalyst 3550-24) • 17.0 Mpps forwarding rate for 64-byte packets (Catalyst 3550-12G and 3550-12T), 10.1 Mpps forwarding rate for 64-byte packets (Catalyst 3550-48), 6.6 Mpps forwarding rate for 64-byte packets (Catalyst 3550-24) • 4 MB memory architecture shared by all ports (Catalyst 3550-12G, 3550-12T, and 3550-48), 2 MB memory architecture shared by all ports (Catalyst 3550-24) • 64 MB DRAM and 16 MB Flash memory • Configurable up to 12,000 MAC addresses (Catalyst 3550-12G and 3550-12T) • Configurable up to 8,000 MAC addresses (Catalyst 3550-48 and 3550-24) • Configurable up to 24,000 unicast routes (Catalyst 3550-12G and 3550-12T) • Configurable up to 16,000 unicast routes (Catalyst 3550-48 and 3550-24) • Configurable up to 8,000 multicast routes (Catalyst 3550-12G and 3550-12T) • Configurable up to 2,000 multicast routes (Catalyst 3550-48 and 3550-24) • Configurable Maximum Transmission Unit (MTU) of up to 2,025 Bytes for bridging of MPLS tagged frames (Catalyst 3550-12G and 3550-12T), Configurable Maximum Transmission Unit (MTU) of up to 1,546 Bytes for bridging of MPLS tagged frames (Catalyst 3550-48 and 3550-24)
Management	• RFC 1213 • IF MIB • CISCO-CDP-MIB • CISCO-IMAGE-MIB • CISCO-FLASH-MIB • OLD-CISCO-CHASSIS-MIB • CISCO-PAGP-MIB • CISCO-VTP-MIB • CISCO-HSRP-MIB • OLD-CISCO-TS-MIB • BRIDGE-MIB (RFC 1493) • CISCO-VLAN-MEMBERSHIP-MIB • CISCO-VLAN-IFINDEX-RELATIONSHIP-MIB • CISCO-STACK-MIB (only a subset of the available MIB objects are implemented; not all objects are supported) • RMON 1 MIB • IGMP MIB • PIM MIB • CISCO-STP-EXTENSIONS-MIB • OSPF-MIB (RFC 1253) • IPMROUTE-MIB • CISCO-MEMORY-POOL-MIB • CISCO-RTTMON-MIB • CISCO-PROCESS-MIB • OLD-CISCO-SYS-MIB • CISCO-CONFIG-MAN-MIB • SNMP MIB II

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Product Specifications (Continued)

Feature	Description
Standards	• IEEE 802.1x (planned future software support) • IEEE 802.1w (planned future software support) • IEEE 802.1s (planned future software support) • IEEE 802.3x full duplex on 10BaseT, 100BaseTX, and 1000BaseT ports • IEEE 802.1D Spanning-Tree Protocol • IEEE 802.1p CoS Prioritization • IEEE 802.1Q VLAN • IEEE 802.3 10BaseT specification • IEEE 802.3u 100BaseTX specification • IEEE 802.3ab 1000BaseT specification • IEEE 802.3z 1000BaseX specification • 1000BaseX (GBIC) • 1000BaseSX • 1000BaseLX/LH • 1000BaseZX • RMON I and II standards • SNMPv1 and SNMPv2c
Y2K	• Y2K compliant
Connectors and Cabling	• 10BaseT ports: RJ-45 connectors; two-pair Category 3, 4, or 5 unshielded twisted-pair (UTP) cabling • 100BaseTX ports: RJ-45 connectors; two-pair Category 5 UTP cabling • 1000BaseT ports: RJ-45; two-pair Category 5 UTP cabling • 1000BaseT GBIC-based ports: RJ-45 connectors; two-pair Category 5 UTP cabling • 1000BaseSX, -LX/LH, -ZX GBIC-based ports: SC fiber connectors, single-mode or multimode fiber • Cisco GigaStack GBIC ports: copper-based Cisco GigaStack cabling • Management console port: 8-pin RJ-45 connector, RJ-45-to-RJ-45 rollover cable with RJ-45-to-DB9 adapter for PC connections; for terminal connections, use RJ-45-to-DB25 female data-terminal-equipment (DTE) adapter (can be ordered separately from Cisco, part number ACS-DSBUASYN=)
Power Connectors	Customers can provide power to a switch by using either the internal power supply or the Cisco Redundant Power System (RPS) 300. The connectors are located at the back of the switch. Internal Power Supply Connector • The internal power supply is an auto-ranging unit. • The internal power supply supports input voltages between 100 and 240 VAC. • Use the supplied AC power cord to connect the AC power connector to an AC power outlet. Cisco RPS Connector • The connector offers connection for an optional Cisco RPS 300 that uses AC input and supplies DC output to the switch. • The connector offers a 300-watt redundant power system that can support six external network devices and provides power to one failed device at a time. • The connector automatically senses when the internal power supply of a connected device fails and provides power to the failed device, preventing loss of network traffic. • When the internal power supply has been brought up or replaced, the Cisco RPS 300 automatically stops powering the device. • Attach only the Cisco RPS 300 (model PWR300-AC-RPS-N1) to the redundant-power-supply receptacle.
Indicators	• Per-port status LEDs: link integrity, disabled, activity, speed, and full-duplex indications • System status LEDs: system, RPS, and bandwidth utilization indications

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Product Specifications (Continued)

Feature	Description
Dimensions and Weight (H x W x D)	• 2.63 x 15.9 x 17.5 in. (6.7 x 40.4 x 44.5 cm) (Catalyst 3550-12G and 3550-12T) • 1.75 x 14.4 x 17.5 in. (4.45 x 36.6 x 44.5 cm) (Catalyst 3550-24) • 1.75 x 16.3 x 17.5 in. (4.45 x 41.3 x 44.5 cm) (Catalyst 3550-48) • 1.5 rack-unit (RU) high (Catalyst 3550-12G and 3550-12T) • 1.0 rack-unit (RU) high (Catalyst 3550-48 and 3550-24) • 16 lb (7.26 kg) (Catalyst 3550-12G and 3550-12T) • 11 lb (5.0 kg) (Catalyst 3550-24) • 13 lb (5.9 kg) (Catalyst 3550-48)
Environmental Ranges	• Operating temperature: 32˚ to 113˚F (0˚ to 45˚C) • Storage temperature: –13˚ to 158˚F (–25˚ to 70˚C) • Operating relative humidity: 10 to 85% (non-condensing) • Operating altitude: Up to 10,000 ft (3,049 m) • Storage altitude: Up to 15,000 ft (4,573 m)
Power Requirements	• Power consumption: 190 W (maximum), 650 BTUs per hour (Catalyst 3550-12G and 3550-12T); 65 W (maximum), 222 BTUs per hour (Catalyst 3550-24); 86 W (maximum), 294 BTUs per hour (Catalyst 3550-48) • AC input voltage/frequency: 100 to 127/200 to 240 VAC (auto-ranging), 50 to 60 Hz • DC Input Voltages: +12V @ 13A (Catalyst 3550-12G, 3550-12T, and 3550-48); +12V @ 8.3A (Catalyst 3550-24)
Mean Time Between Failure (MTBF)	• 110,332 hours (Catalyst 3550-12G) • 113,658 hours (Catalyst 3550-12T) • 193,000 hours (Catalyst 3550-24) • 163,000 hours (Catalyst 3550-48)
Regulatory Agency Approvals	
Safety Certifications	• UL to UL 1950, Third Edition • c-UL to CAN/CSA 22.2 No. 950-95, Third Edition • TUV/GS to EN 60950 with Amendment A1-A4 and A11 • CB to IEC 60950 with all country deviations • NOM to NOM-019-SCFI • CE Marking
Electromagnetic Emissions Certifications	• FCC Part 15 Class A • EN 55022 Class A (CISPR 22 Class A) • VCCI Class A • AS/NZS 3548 Class A • BSMI • CE Marking
Warranty	Limited lifetime warranty

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Service and Support

The services and support programs described in the table below are available as part of the Cisco Desktop Switching Service and Support solution, and are available directly from Cisco and through resellers.

Service and Support	Features	Benefits
Advanced Services		
Total Implementation Solutions (TIS)—available direct from Cisco **Packaged Total Implementation Solutions (Packaged TIS)**—available through resellers	• Project management • Site survey, configuration deployment *(including development and verification of configurations for QoS and multicast)* • Installation, text, and cutover • Training • Major Moves, Adds, Changes (MAC) • Design review and product staging	• Supplements existing staff • Ensures functionality meets needs • Mitigates risk
Technical Support Services		
SMARTnet* and *SMARTnet Onsite* (OS)**—available direct from Cisco **Packaged *SMARTnet—available through resellers	• 24x7 access to software updates • Web access to technical repositories • Telephone support through the Technical Assistance Center • Advance replacement of hardware parts	• Enables proactive or expedited issue resolution • Lowers cost of ownership by utilizing Cisco expertise and knowledge • Minimize network downtime

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Ordering Information

Model Numbers	Configuration
WS-C3550-12G	• 10 1000BaseX ports + 2 10/100/1000BaseT ports • 1.5 rack unit (RU) stackable, multilayer Gigabit Ethernet switch • Delivers enterprise-class intelligent services to the network edge • Provides full dynamic IP routing
WS-C3550-12T	• 10 10/100/1000BaseT ports + 2 1000BaseX ports • 1.5 rack unit (RU) stackable, multilayer Gigabit Ethernet switch • Delivers enterprise-class intelligent services to the network edge • Provides full dynamic IP routing
WS-C3550-24-SMI	• 24 10/100 ports + 2 1000BaseX ports • 1 RU stackable, multilayer switch • Delivers enterprise-class intelligent services to the network edge • Standard Multilayer Software Image (SMI) installed, upgradeable to full dynamic IP routing
WS-C3550-24-EMI	• 24 10/100 ports + 2 1000BaseX ports • 1 RU stackable, multilayer switch • Delivers enterprise-class intelligent services to the network edge • Enhanced Multilayer Software Image (EMI) installed • Provides full dynamic IP routing
WS-C3550-48-SMI	• 48 10/100 ports + 2 1000BaseX ports • 1 RU stackable, multilayer switch • Delivers enterprise-class intelligent services to the network edge • Standard Multilayer Software Image (SMI) installed, upgradeable to full dynamic IP routing
WS-C3550-48-EMI	• 48 10/100 ports + 2 1000BaseX ports • 1 RU stackable, multilayer switch • Delivers enterprise-class intelligent services to the network edge • Enhanced Multilayer Software Image (EMI) installed • Provides full dynamic IP routing
CD-3550-EMI=	• Enhanced Multilayer Software Image (EMI) upgrade kit for standard versions of the Catalyst 3550-24 and 3550-48 switches • Provides full dynamic IP routing
RCKMNT-3550-1.5RU=	• Spare rack mount kit for the Catalyst 3550-12G and 3550-12T switches
RCKMNT-1RU=	• Spare rack mount kit for the Catalyst 3550-24 and 3550-48 switches

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